

Claims:

- 1 1. A method of generating a communication frequency based on a modulo 23 solution for an
2 input variable, comprising:
 - 3 receiving an input variable;
 - 4 generating an intermediate modulo 23 solution by:
 - 5 generating a binary representation of said input variable;
 - 6 using the five rightmost digits of said binary representation of said input variable to
7 represent a first intermediate remainder (R');
 - 8 using the remaining three leftmost digits to represent a first intermediate quotient
9 (Q');
 - 10 expressing said first intermediate modulo solution as a sum of said first intermediate
11 quotient (Q') multiplied by 9 plus said first intermediate remainder (R'); and
 - 12 comparing said first intermediate modulo solution to the quantity 32;
 - 13 indicating said first intermediate remainder (R') as the modulo remainder (R) if said
14 quantity of said first intermediate modulo solution is less than 32; and
 - 15 using said modulo remainder to generate said communication frequency.

- 1 2. The method according to claim 1 wherein an iterative process is performed if said first
2 intermediate modulo solution is greater than 32, said iterative process comprising:
 - 3 (a) generating a binary representation of said first intermediate modulo solution;
 - 4 (b) using the five rightmost digits of said binary representation of said first intermediate
5 modulo solution to represent a second intermediate remainder (R'')
 - 6 (c) using said remaining three leftmost digits to represent a second intermediate

- 7 quotient (Q'');
- 8 (d) expressing said second intermediate modulo solution as a sum of said second
9 intermediate quotient (Q'') multiplied by 9 plus said second intermediate remainder
10 (R'');
- 11 (e) comparing said second intermediate modulo solution to the quantity 32;
- 12 (f) indicating said second intermediate remainder (R'') as the modulo remainder (R) if
13 said quantity of said second intermediate modulo solution is less than 32; and
- 14 (g) repeating steps (a) through (f) if said intermediate modulo solution is greater than 32
15 and continuing until the intermediate modulo solution is less than 32.

1 3. The method according to claim 1, wherein said multiplication of said first intermediate
2 quotient (Q') by 9 is accomplished by:

3 shifting said binary representation of Q' to the left by three places; and
4 adding said left-shifted value of Q' to the original value of Q' .

1 4. The method according to claim 2, wherein said multiplication of said second intermediate
2 quotient (Q'') by 9 is accomplished by:

3 shifting said binary representation of Q'' to the left by three places; and
4 adding said left-shifted value of Q'' to the original value of Q'' .

1 5. A method of generating a modulo 79 solution for an input variable, comprising:
2 receiving an input variable;
3 generating an intermediate modulo 79 solution by:
4 generating a binary representation of said input variable;

5 using the seven rightmost digits of said binary representation of said input variable
6 to represent a first intermediate remainder (R');
7 using the remaining leftmost digits to represent a first intermediate quotient (Q');
8 expressing said first intermediate modulo solution as a sum of said first intermediate
9 quotient (Q') multiplied by 49 plus said first intermediate remainder (R');
10 and
11 comparing said first intermediate modulo solution to the quantity 128;
12 indicating said first intermediate remainder (R') as the modulo remainder (R) if said
13 quantity of said first intermediate modulo solution is less than 128; and
14 using said modulo remainder to generate said communication frequency.

1 6. The method according to claim 5 wherein an iterative process is performed if said first
2 intermediate modulo solution is greater than 128, said iterative process comprising:

- 3 (a) generating a binary representation of said first intermediate modulo solution;
- 4 (b) using the seven rightmost digits of said binary representation of said first
5 intermediate modulo solution to represent a second intermediate remainder (R'')
- 6 (c) using said remaining leftmost digits to represent a second intermediate quotient
7 (Q'');
- 8 (d) expressing said second intermediate modulo solution as a sum of said second
9 intermediate quotient (Q'') multiplied by 49 plus said second intermediate remainder
10 (R'');
- 11 (e) comparing said second intermediate modulo solution to the quantity 128;
- 12 (f) indicating said second intermediate remainder (R'') as the modulo remainder (R) if

13 said quantity of said second intermediate modulo solution is less than 128; and
14 (g) repeating steps (a) through (f) if said intermediate modulo solution is greater than
15 128 and continuing until the intermediate modulo solution is less than 128.

1 7. The method according to claim 5, wherein said multiplication of said first intermediate
2 quotient (Q') by 49 is accomplished by:

3 shifting said binary representation of Q' to the left by 5 places to define a first shifted Q'
4 value,

5 shifting said binary representation of Q' to the left by 4 places to define a second shifted Q'
6 value; and

7 adding said first and second shifted values of Q' to the original value of Q' .

1 8. The method according to claim 6, wherein said multiplication of said second intermediate
2 quotient (Q'') by 9 is accomplished by:

3 shifting said binary representation of Q'' to the left by 5 places to define a first shifted Q''
4 value,

5 shifting said binary representation of Q'' to the left by 4 places to define a second shifted Q''
6 value; and

7 adding said first and second shifted values of Q'' to the original value of Q'' .

1 9. A system for generating a communication signal at a predetermined frequency, comprising:
2 a transceiver, said transceiver comprising:
3 a radio frequency module;
4 a baseband core further comprising a frequency control functionality;

5 a frequency hopper within said baseband core of said transceiver, said frequency hopper
6 being operable to generate a plurality of frequencies related to a modulo 23 solution of an input
7 variable, wherein said frequency hopper generates an intermediate modulo 23 solution by:
8 generating a binary representation of said input variable;
9 using the five rightmost digits of said binary representation of said input variable to
10 represent a first intermediate remainder (R');
11 using the remaining three leftmost digits to represent a first intermediate quotient
12 (Q');
13 expressing said first intermediate modulo solution as a sum of said first intermediate
14 quotient (Q') multiplied by 9 plus said first intermediate remainder (R');
15 comparing said first intermediate modulo solution to the quantity 32; and
16 indicating said first intermediate remainder (R') as the modulo remainder (R) if said
17 quantity of said first intermediate modulo solution is less than 32.

1 10. The method according to claim 9 wherein an iterative process is performed if said first
2 intermediate modulo solution is greater than 32, said iterative process comprising:
3 (a) generating a binary representation of said first intermediate modulo solution;
4 (b) using the five rightmost digits of said binary representation of said first intermediate
5 modulo solution to represent a second intermediate remainder (R'')
6 (c) using said remaining three leftmost digits to represent a second intermediate
7 quotient (Q'');
8 (d) expressing said second intermediate modulo solution as a sum of said second
9 intermediate quotient (Q'') multiplied by 9 plus said second intermediate remainder

- 1 11. The method according to claim 9, wherein said multiplication of said first intermediate
- 2 quotient (Q') by 9 is accomplished by:
 - 3 shifting said binary representation of Q' to the left by three places; and
 - 4 adding said left-shifted value of Q' to the original value of Q' .

1 12. The method according to claim 10, wherein said multiplication of said second intermediate
2 quotient (Q'') by 9 is accomplished by:
3 shifting said binary representation of Q'' to the left by three places; and
4 adding said left-shifted value of Q'' to the original value of Q'' .

1 13. A system for generating a communication signal at a predetermined frequency, comprising:

2 a transceiver, said transceiver comprising:

3 a radio frequency module;

4 a baseband core further comprising a frequency control functionality;

5 a frequency hopper within said baseband core of said transceiver, said frequency hopper

6 being operable to generate a plurality of frequencies related to a modulo 79 solution

7 of an input variable, wherein said frequency hopper generates an intermediate

8 modulo 79 solution by:

9 generating a binary representation of said input variable;

10 using the seven rightmost digits of said binary representation of said input variable

11 to represent a first intermediate remainder (R');

12 using the remaining leftmost digits to represent a first intermediate quotient (Q');

13 expressing said first intermediate modulo solution as a sum of said first intermediate

14 quotient (Q') multiplied by 49 plus said first intermediate remainder (R');

15 comparing said first intermediate modulo solution to the quantity 128; and

16 indicating said first intermediate remainder (R') as the modulo remainder (R) if said

17 quantity of said first intermediate modulo solution is less than 128.

1 14. The method according to claim 13 wherein an iterative process is performed if said first
2 intermediate modulo solution is greater than 128; said iterative process comprising:

3 (a) generating a binary representation of said first intermediate modulo solution;

4 (b) using the seven rightmost digits of said binary representation of said first
5 intermediate modulo solution to represent a second intermediate remainder (R'');
6 (c) using said remaining leftmost digits to represent a second intermediate quotient
7 (Q'');
8 (d) expressing said second intermediate modulo solution as a sum of said second
9 intermediate quotient (Q'') multiplied by 49 plus said second intermediate remainder
10 (R'');
11 (e) comparing said second intermediate modulo solution to the quantity 128;
12 (f) indicating said second intermediate remainder (R'') as the modulo remainder (R) if

13 said quantity of said second intermediate modulo solution is less than 128; and
14 (g) repeating steps (a) through (f) if said intermediate modulo solution is greater than
15 128 and continuing until the intermediate modulo solution is less than 128.

1 15. The method according to claim 13, wherein said multiplication of said first intermediate
2 quotient (Q') by 49 is accomplished by:

3 shifting said binary representation of Q' to the left by 5 places to define a first shifted Q'
4 value,

5 shifting said binary representation of Q' to the left by 4 places to define a second shifted Q'
6 value; and

7 adding said first and second shifted values of Q' to the original value of Q' .

1 16. The method according to claim 14, wherein said multiplication of said second intermediate
2 quotient (Q'') by 9 is accomplished by:

3 shifting said binary representation of Q' to the left by 5 places to define a first shifted Q'
4 value,

5 shifting said binary representation of Q' to the left by 4 places to define a second shifted Q'
6 value; and

7 adding said first and second shifted values of Q' to the original value of Q' .

1 17. A system for generating communication frequencies in a wireless interface system that
2 services communications between a wirelessly enabled host and at least one user input device,
3 comprising:

4 a wireless interface unit that wirelessly interfaces with the wirelessly enabled host, wherein

5 the wireless interface unit comprises:

6 an analog module including a transceiver unit and a frequency synthesizer,

7 a baseband module including a frequency hopper, wherein said frequency hopper is

8 operable to generate a plurality of frequencies related to a modulo 23

9 solution of an input variable, wherein said frequency hopper generates an

10 intermediate modulo 23 solution by:

11 generating a binary representation of said input variable;

12 using the five rightmost digits of said binary representation of said input

13 variable to represent a first intermediate remainder (R');

14 using the remaining three leftmost digits to represent a first intermediate

15 quotient (Q');

16 expressing said first intermediate modulo solution as a sum of said first

17 intermediate quotient (Q') multiplied by 9 plus said first intermediate

18 remainder (R');

19 comparing said first intermediate modulo solution to the quantity 32; and

20 indicating said first intermediate remainder (R') as the modulo remainder

21 (R) if said quantity of said first intermediate modulo solution is less

22 than 32; and

23 wherein said frequency synthesizer is operable to generate a frequency hop
24 sequence using said result of said modulo 23 solution generated by
25 said frequency hopper.

1 18. The system according to claim 17 wherein an iterative process is performed if said first
2 intermediate modulo solution is greater than 32; said iterative process comprising:

- 3 (a) generating a binary representation of said first intermediate modulo solution;
- 4 (b) using the five rightmost digits of said binary representation of said first intermediate
5 modulo solution to represent a second intermediate remainder (R'');
- 6 (c) using said remaining three leftmost digits to represent a second intermediate
7 quotient (Q'');
- 8 (d) expressing said second intermediate modulo solution as a sum of said second
9 intermediate quotient (Q'') multiplied by 9 plus said second intermediate remainder
10 (R'');
- 11 (e) comparing said second intermediate modulo solution to the quantity 32;
- 12 (f) indicating said second intermediate remainder (R'') as the modulo remainder (R) if
13 said quantity of said second intermediate modulo solution is less than 32; and
- 14 (g) repeating steps (a) through (f) if said intermediate modulo solution is greater than 32
15 and continuing until the intermediate modulo solution is less than 32.

1 19. The method according to claim 17, wherein said multiplication of said first intermediate
2 quotient (Q') by 9 is accomplished by:
3 shifting said binary representation of Q' to the left by three places; and

4 adding said left-shifted value of Q' to the original value of Q' .

1 20. The method according to claim 18, wherein said multiplication of said second intermediate
2 quotient (Q'') by 9 is accomplished by:

3 shifting said binary representation of Q'' to the left by three places; and

4 adding said left-shifted value of Q'' to the original value of Q'' .

1 21. A system for generating communication frequencies in a wireless interface system that
2 services communications between a wirelessly enabled host and at least one user input device,
3 comprising:

4 a wireless interface unit that wirelessly interfaces with the wirelessly enabled host, wherein
5 the wireless interface unit comprises:

6 an analog module including a transceiver unit and a frequency synthesizer,

7 a baseband module including a frequency hopper, wherein said frequency hopper is
8 operable to generate a plurality of frequencies related to a modulo 79
9 solution of an input variable, wherein said frequency hopper generates an
10 intermediate modulo 79 solution by:

11 generating a binary representation of said input variable;

12 using the seven rightmost digits of said binary representation of said input variable to
13 represent a first intermediate remainder (R');

14 using the remaining leftmost digits to represent a first intermediate quotient (Q');

15 expressing said first intermediate modulo solution as a sum of said first intermediate
16 quotient (Q') multiplied by 49 plus said first intermediate remainder (R');

17 comparing said first intermediate modulo solution to the quantity 128; and
18 indicating said first intermediate remainder (R') as the modulo remainder (R) if said
19 quantity of said first intermediate modulo solution is less than 128.

1 22. The system according to claim 21 wherein an iterative process is performed if said first
2 intermediate modulo solution is greater than 128, said iterative process comprising:

- 3 (a) generating a binary representation of said first intermediate modulo solution;
- 4 (b) using the seven rightmost digits of said binary representation of said first
5 intermediate modulo solution to represent a second intermediate remainder (R'');
6 (c) using said remaining leftmost digits to represent a second intermediate quotient
7 (Q'');
8 (d) expressing said second intermediate modulo solution as a sum of said second
9 intermediate quotient (Q'') multiplied by 49 plus said second intermediate remainder
10 (R'');
11 (e) comparing said second intermediate modulo solution to the quantity 128;
12 (f) indicating said second intermediate remainder (R'') as the modulo remainder (R) if
13 said quantity of said second intermediate modulo solution is less than 128; and
14 (g) repeating steps (a) through (f) if said intermediate modulo solution is greater than
15 128 and continuing until the intermediate modulo solution is less than 128.

1 23. The system according to claim 22, wherein said multiplication of said first intermediate
2 quotient (Q') by 49 is accomplished by:
3 shifting said binary representation of Q' to the left by 5 places to define a first shifted Q'

4 value,

5 shifting said binary representation of Q' to the left by 4 places to define a second shifted Q'

6 value; and

7 adding said first and second shifted values of Q' to the original value of Q'.

1 24. The system according to claim 14, wherein said multiplication of said second intermediate
2 quotient (Q'') by 9 is accomplished by:

3 shifting said binary representation of Q' to the left by 5 places to define a first shifted Q'

4 value,

5 shifting said binary representation of Q' to the left by 4 places to define a second shifted Q'

6 value; and

7 adding said first and second shifted values of Q' to the original value of Q'.